BARBADOS.

IMPERIAL MYCOLOGICAL INSTITUTE
10 DEC 1942

ANNUAL REPORT

OF THE

Department of Science and Agriculture

FOR THE YEAR

1940—41.

Printed by the Advocate Co., Ltd.
Printers to the Government of Barbados.

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REPORT ON THE WORK OF THE DEPARTMENT OF SCIENCE AND AGRICULTURE

For the Year Ending the 31st March, 1941.

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STAFF

Dr. S. J. Saint visited the land settlement at Vieux Fort, St. Lucia on duty leave, from 12th to 20th April, 1940 and 23rd October to 4th November, 1940. He also visited Trinidad from 2nd to 9th May to represent Barbados at a Food Conference, and again from 20th to 28th July, to attend a meeting of the Advisory Committee of the British West Indies Central Cane Breeding Station.

Dr. A. E. S. McIntosh, Assistant Director of Agriculture and Botanist, was appointed Deputy Director of Agriculture and Botanist on 24th August, 1940. In his capacity as Geneticist to the British West Indies Central Cane Breeding Station he visited Trinidad from 20th to 28th July and Jamaica from 28th September to 29th October, 1940.

Mr. C. A. Coppin, Government Analyst, was absent on duty leave in Montserrat from 16th to 20th April, 1940, and from 29th August to 7th September, 1940.

Mr. D. M. Hanschell, Assistant Botanist of the British West Indies Central Cane Breeding Station, was appointed Assistant Botanist of the Department of Science and Agriculture on 15th December, 1940.

Mr. B. Johnston, who was appointed Agricultural Chemist on 7th August, 1939 left the Colony on July 26th 1940 to serve with His Majesty's Forces.

Mr. C. S. Curwen, a temporary sub-inspector of plant diseases was appointed, as from 1st November, 1940 to the new post of Fruit Inspector.

SECTION I. GENERAL AGRICULTURE

1. WEATHER CONDITIONS.

The rainfall during 1940 averaged 45.74 inches. This is two inches more than the average for 1939 and ten inches less than the average for the twenty year period, 1920/39. The severity of the dry season, January—June, was somewhat alleviated by a good March rainfall which was of special benefit to the ratoons. During the rainy season, July—December, the rainfall was insufficient to sustain optimum growth and any hopes of making even an average crop were dispelled by an unusually severe drought lasting from December, 1940 throughout the crop period of 1941. As in the previous season, this drought caused a forced ripening of the canes and as a result, juice purities and consequently factory recoveries were lower than average.

2. The low rainfall, although detrimental to cane growth and sugar production, favoured the cotton crop and the seed cotton yields were good. Ground provisions were unfavourably affected by the low rains and yields were low. This was particularly noticeable in the case of the yam and eddoe crops which have a longer growing season.

2. SUGAR.

3. The 1940 sugar crop amounted to the equivalent of 97,224 tons of sugar made up as follows:

Vacuum Pan factories	67,136 tons
Muscovado factories	3,068 tons
* Fancy Molasses	27,020 tons
	97,224 tons

4. The crop to be reaped in 1941 is estimated to reach the equivalent of 100,000 tons.

5. The position with regard to local consumption of sugar and exports of sugar and fancy molasses during the third quota year (1939/40) may be summarised as follows:—

			Tons.
Estimated stocks in hand for export at 1st September, 1939:			
Fancy molasses	10,019 tons		
Sugar	439 ,,		10,458
Production: Crop 1940			97,224
			107,682
Estimated stocks in hand for export at 1st September, 1940:			
Fancy molasses	11,145 tons		
Sugar	468 ,,		11,613
			96,069
Total exports for third quota year (1939/40) as per Customs returns:			
Fancy molasses	25,439 tons		
Sugar	59,850 ,,		85,289
Difference, representing sugar left in the Island for local consumption			10,780

* 8,916,668 wine gallons equated at the rate of 330 wine gallons to the ton of sugar.

6. In consequence of an increased demand for Fancy Molasses in Canada, approximately 81,000 puncheons of Fancy Molasses were manufactured during 1940. Owing to the drought, the small fancy molasses factories were only able to manufacture 41,000 puncheons of this amount and the remainder was manufactured by seven of the larger vacuum pan factories. Production during 1941 is expected to be about 76,000 puncheons.

7. The returns received from plantations for the 1941 crop showed that there were 34,670 acres under cane, made up of 14,059 acres plant cane, 11,846 acres first ratoons, 6,580 acres second ratoons, 1,943 acres third ratoons and 242 acres fourth and fifth ratoons; acreages approximately similar to those of the 1940 crop. In addition, the acreage of cane estimated to have been reaped by small holders is 7,000.

8. The percentages of the total acreage under the various varieties reaped in 1941 are as follows:—

	VARIETIES.					
	B.2935	B.H.10 (12)	B.726	B.3013	B.3127	Other varieties.
Percentages	45.66	22.16	17.33	8.58	3.30	2.97

This represents slight increases in the percentages of B.2935, B.3013, B.3127 at the expense of B.H.10(12), B.726 and other unspecified varieties.

9. Several new seedlings, notably B.35187, B.35245 and B.37161 have shown exceptional promise in field trials under Barbados conditions. Over 34,000 cuttings of these, together with the less tested but promising seedlings B.3419, B.34104 and B.38233 were distributed to plantations and peasants. Recommendations for sugar cane variety planting for the 1940/42 crop were issued as usual from the Department of Agriculture to all plantations and peasants' areas.

3. COTTON.

10. The acreage in cotton increased from 120 acres in 1939 to 453 acres in 1940. Growth was good and the yields of seed cotton obtained were above average. The total yield of seed cotton was 179,155 pounds made up of 65,982 pounds from 105 acres of plantation cotton and 113,173 pounds from 348 acres of peasant cotton. The average yield for plantation and peasant cotton was approximately 400 pounds per acre. The ginnery percentage as recorded by the Barbados Co-op. Cotton Factory was 25.66%. For the second year in succession no pink boll worm was found and this leads to the hope that this serious pest is being effectively controlled by the measures adopted.

4. ARROWROOT.

11. An attempt was made to encourage the growing of arrowroot in a restricted area of hilly land in the Scotland district ; an area which is not economically suited to cane cultivation. An Arrowroot Growers' Association was established in 1937 and a loan made by Government for the construction of a factory. Crops were manufactured into arrowroot starch during 1938, 1939 and 1940, but on account of inadequate supervision by the members of the Association the yield and quality of the starch became successively poorer. For the 1941 crop, it was decided to give a greater measure of assistance to the Association with the result that a record crop of over ten tons of very good quality starch was made. This experiment in co-operative peasant production indicates that support and encouragement by officers of the Department of Agriculture over a period of years is essential for success.

5. MINOR CROPS.

12. *Ground Provisions.* The acreage of ground provisions grown by plantations under war conditions is regulated by notices served under the Vegetable Production (Defence) Control Order, 1939, issued under Regulation 50 of the Defence Regulations, 1939. During the season 1940/41, the owners of plantations were required to plant ten per cent. of their arable acreage in specified ground provisions. The harvesting dates of sweet potatoes which is a perishable crop were controlled while other crops such as yams, eddoes, corn, pulses, etc., were permitted to be harvested at any time provided they were mature and in a state fit for human consumption.

13. During the season 1941/42, fifteen per cent. of the arable acreage of plantations must be planted in ground provisions.

14. The low rainfall of 1940 seriously retarded planting dates and consequently lowered the yields of ground provisions. In spite of these considerations yams have been plentiful and prices low. The increased quantities of ground provisions available on the local market have resulted in a lower consumption of imported rice which is the staple carbohydrate food in Barbados.

15. In connection with the growing of ground provisions, the Experimental Station of the Department, issued planting material of sweet potatoes, cassava, corn and various pulses, throughout the period under review.

16. *Vegetables.* Although no statistics are available it is evident that the area planted in vegetable crops continues to increase. Vegetable growing is almost exclusively carried on by peasants and in private and school gardens. Except where irrigation is possible, vegetables cannot be grown satisfactorily during the dry season and extension of vegetable growing is largely dependent on irrigation facilities. Although a number of enterprising small holders have sunk wells and provided themselves with pumps, many more would do so if they possessed the needed capital. It is considered very desirable that financial assistance should be made available to small holders who wish to sink shallow wells on their holdings and render themselves partially independent of rainfall. This matter is further dealt with under the section of this Report dealing with the Peasants' Loan Bank.

17. The Department continues to encourage vegetable growing by the stocking and sale at cost price of approved and tested varieties of vegetable seeds. The sales of these seeds have more than doubled during the past year. Testing of new vegetable varieties continues and, as a result, new varieties of stringless and lima beans and beet have been added to the list of vegetable seeds available for distribution by the Department during the year.

18. *Fruit Trees.* The distribution of fruit trees by the Department continues on an increasing scale. The fruit trees propagated are chiefly grapefruit, lime, orange, avocada pear and breadfruit. Although successful methods of grafting were developed at the Experimental Station, the subsequent development of the grafted mango trees, when distributed to growers, was not satisfactory. On the other hand, the top working of mango trees has proved highly successful. Accordingly, it was decided to stop the grafting and distribution of mango trees and, in its stead, to advise the growing of seedling trees which could be subsequently top worked.

19. During the year, 2,113 trees, comprising citrus varieties, figs, guava, mango, pear and breadfruit were sent out and 265 mango trees were top worked by officers of the Department.

6. ORNAMENTAL PLANTS.

20. Altogether, 21,413 ornamental plants were distributed this year including 5,384 distributed free of charge or at a nominal cost during Arbor Week.

7. AFFORESTATION SCHEME.

21. This is a continuation of the scheme noted in paragraphs 28 and 29 of last year's report. During the year, 142 orders for casuarina trees were received and 139,634 trees distributed. Unfortunately, the excessively dry conditions which prevailed during the normal rainy season, made the establishment of young trees very difficult and it is feared that the majority of these have been lost. Further distributions will be made next year and it is hoped that better climatic conditions will be experienced.

8. INSPECTION OF GROUND PROVISIONS FOR EXPORT.

22. Under the Exportation of Fruit Act (1940–22) a Fruit Inspector was appointed on 1st November, 1940. He is required to inspect all ground provisions for export in order to ensure that they comply with the specifications defined in the Regulations made under the Act.

23. Export permits for ground provisions were granted under the Defence Regulations during the period when there was a surplus on the local market. During this period a total of 467 tons of ground provisions were inspected and 510 certificates of fitness for export issued. The markets ranged throughout the West Indies from Aruba to Bermuda, the principal market being Trinidad. In the same period, 319 Produce Export Certificates were issued in respect of consignments for Trinidad in order to comply with Regulation No. 13, 1938, of Trinidad and Tobago.

9. LAND SETTLEMENT.

24. During the year under review, the Vieux Fort Estate in St. Lucia was further developed. The factory produced 1,065 tons of sugar in 1940 from 562 acres, but, owing to unfavourable growing conditions, the 1941 crop has not come up to expectations and is now estimated to be about 1,500 tons from 792 acres.

25. Certain settlers who for various reasons had proved unsatisfactory returned to Barbados during the year. No further families have since been sent and it is expectd that the emigration of settler families will remain in abeyance until the conclusion of arrangements between the U.S.A. Government and the British Government for the establishment of an aeroplane base at Vieux Fort largely on lands at present owned by the Barbados Settlement Co., Ltd.

SECTION II. WORK OF DEPARTMENT OF AGRICULTURE

1. BOTANICAL SECTION.

(*a*) *Sugar Cane Breeding.*

26. *B.43' Series.* During the 1940 season 78 crosses were made and for the first time in the history of cane breeding in Barbados these did not include any purely noble cane crosses. After growing 20,247 seedlings in pots, 17,161 were eventually planted in the field nursery.

27. *B.42' Series.* The number of seedlings selected for planting in the First Year Seedling Trial in October, 1940, was 10,209 of which only 437 were from noble cane crosses. This trial will be reaped in 1942.

28. *B.41' Series.* In this series, 8,635 seedlings were reaped this year and 199 selected for further trial.

29. *B. 40. Series.* In this series, 108 noble canes and 184 nobilised seedlings were selected during the 1940 crop and these were multiplied at Codrington Experimental Station until November. Sixty-nine noble cane seedlings were then selected which, with the exception of one which was planted in Select Seedling Trials, were all planted in plots at Dodds for multiplication and gumming disease resistance tests. Ninety-nine nobilised seedlings were selected and allocated as follows:—

(a) Central Sugar Cane Breeding Station—Thick cane trial at Codrington and Cliff for 1940-42—63 seedlings—Standards B.2935 at Codrington and B.H. 10(12) at Cliff.

(b) Central Sugar Cane Breeding Station—Thin cane trial at Codrington and Cliff for 1940-42—18 seedlings—Standards B.37161 and B.34104 at Codrington and B.H. 10(12) and B.34104 at Cliff.

(c) Select Seedling Trials for 1940-42—3 seedlings.

(d) For breeding work at Lion Castle—15 seedlings.

30. *B.39' Series. Noble Canes.* These were selected from the first year seedling trials in 1939, multiplied at Codrington, and in November sent to Dodds for further multiplication and gumming disease resistance tests. Out of 105 seedlings, 44 were eliminated on account of poor appearance and susceptibility to gumming disease. The remainder were planted in second year seedling trials at Dodds, Todds and Vaucluse in November, 1940.

31. *B.39' Series. Nobilised Seedlings.* These selections made in the multiplication plots at Codrington Experimental Station in October 1939, were tested in a second year trial at Codrington during the season 1939-41. Selections on reaping were as follows:—

(i) Thick cane trial—Standards B.2935 and P.O.J.2878. Out of 45 seedlings reaped, 18 were selected.

(ii) Thin cane trial—Standards Co.213. Out of 24 seedlings reaped, 7 were selected. Selections from the above trials were allocated as follows:—

(a) Select Seedling Trials—Barbados—8 seedlings.

(b) Plant Quarantine Station, Trinidad, for trial in other West Indian Islands 20 „

(c) Lion Castle for breeding work 5 „

32. *B.38' Series. Noble Canes.* These were selected from the multiplication plots and gumming disease tests at Dodds in November 1939 and planted in second year trials which were reaped during the present crop. Out of a total of 49 seedlings reaped, only a single seedling—B.3856 was selected.

33. *Select Seedling and Maturity Trials—Plant Canes.* In all, 10 Select Seedling and Maturity Trials were reaped during the 1941 season, each trial being reaped both early and late in the crop. The following seedlings were included in these trials:—B.3371, B.3521, B.3540, B.37157, B.37161 and B.37181 as well as the appropriate standard varieties. In every trial the seedling B.37161 was easily superior, both in cane tonnage and yield of sugar per acre, to every other variety. Its superiority in cane tonnage ranged from 35% in the black soils to 70% in the valley soils. In this outstanding performance the ratooning of this seedling is being carefully watched.

34. *Select Seedling Trials—First Ratoons.* Over the two trials reaped in the intermediate rainfall area, the variety B.3439 gave 65% higher yield in canes per acre than the standard variety B.2935.

35. *Select Seedling and Maturity Trials—Second Ratoons.* Over the two trials reaped in the high rainfall area, the varieties B.35187 and B.35245 gave increased yields of cane over the standard varieties by 37% and 47% respectively.

36. *Select Seedling Trial—Third Ratoons.* In the single trial reaped in the high rainfall area, both B.3439 and B.3127 were superior to the standard variety, while B.3013 was inferior.

37. *Variety Trials—Plant Canes.* In all, 12 variety plant cane trials were reaped during the crop. These were designed to test the seedlings B.35187 and B.35245 against the standard varieties in the various rainfall and soil type areas of the Island. In the low and intermediate black soil areas both seedlings were slightly inferior in cane tonnage to the standard B.2935, while, in the valley soils and high rainfall areas, they were both superior to the standard varieties; B.35245 more so than B.35187.

38. *Variety Trials—First Ratoons.* In all, six variety first ratoon trials were reaped. In the low and intermediate rainfall areas the variety B.3439 was easily superior to the standard B.2935. In the high rainfall area there was little to choose between B.3419 and the standard B.H.10(12).

39. *Variety Trials—Second Ratoons.* Three second ratoon variety trials were reaped during the crop. In the intermediate rainfall area B.3439 was easily superior to B.2935. In the high rainfall area there was little to choose between the two varieties B.3013 and B.3127 and the standards B.726 and B.H.10(12).

(*b*) *Special Investigations.*

40. *Growth Measurements.* During the season 1939-41 growth measurements were carried out on the following newer seedlings in the plant cane maturity experiments at the low rainfall station Norwood and the high rainfall station Pool: B.3371, B.37157, B.37161 and B.37181. For purposes of comparison the following standard varieties were included: B.H.10(12), (high rainfall station), B.726 (high and low rainfall station) and B.2935 (low rainfall station).

41. *Gumming Disease Resistance Test.* During the season 1939-41, 97 noble canes and 153 nobilised seedlings were tested at Dodds for their resistance to gumming disease and 59 noble canes and 151 nobilised seedlings showed no symptoms of gumming. It should be noted that throughout the period of observation the spread of gumming disease, even on the highly susceptible variety Ba.11569, was very slight.

42. *Sugar Cane Mosaic Disease Resistance Test.* Since the inauguration of the test in September 1937, a total of 229 seedlings have been tested and of these 74 were shown to be susceptible to mosaic disease. During the period under review the area covered by the test was considerably extended so that the total number of seedlings included in the test at any one time amounted to 178.

(c) *Cotton.*

43. Progeny row selection work was continued during the year. The seed for this work was obtained from five plants selected from the progeny row during the 1939-40 season; the selections were made from B.1—Row 3, B.3—Row 1, B.3—Row 2 (two plants) and B.4—Row 3 and were re-numbered: B.4001, B.4002, B.4003, B.4004 and B.4005 respectively.

44. For the present season each selection was planted in triplicate rows of 50 plants. Two plants were selected in each row, the flowers were selfed and the seed cotton bagged separately. The flowers on the remaining plants in each row were also selfed and the seed cotton from each row bagged separately. This seed will be grown to provide commercial planting material for the 1942-43 crop.

45. The selfed seed of the "bulked" seed cotton from the 1939-40 progeny rows was grown at Codrington Experimental Station this season and will be distributed for commercial planting for the 1941-42 crop.

46. During the year a variety trial with the two principal Barbados strains and five strains from St. Vincent and Montserrat was carried out to compare yields and lint qualities. Details of this trial will be published elsewhere.

(d) *Minor Crops.*

47. *Economic Fruit Trees.* Throughout the period under review the usual propagation and distribution of economic fruit trees was continued. The various methods of propagation have been described elsewhere.

48. *Vegetables.* Work carried out on vegetables consisted of the importation of new varieties from the Associated Seed Growers Inc. New Haven, Connecticut and the testing of these against the standard varieties at present grown in the Island.

49. (a) *Stringless Beans.* Four imported varieties were tested against the standard varieties Bountiful and Kentucky Wonder (Pole). Of the importations the variety Idaho Refugee gave an outstanding yield and was moreover resistant to mildew while all of the other varieties, with the exception of Kentucky Wonder, were extremely susceptible. The variety Idaho Refugee has now been placed on the Department's list of seed for distribution.

50. (b) *Lima Beans.* Three imported varieties were tested against the standard, Peter Henderson's Fordhook. The imported variety Jackson Wonder easily outyielded all the other varieties and has been placed on the Department's list of seed for distribution.

51. (c) *Beet.* Two imported varieties, Asgrow Wonder and Detroit Dark Red were tested against the standard variety Suttons Globe. Both importations outyielded the standard and of the two, Detroit Dark Red was of better quality. This variety has been placed on the Department's list of seed for distribution.

52. (d) *Carrot.* The imported variety, Asgrow Imperator was tested against the standard varieties, Oxheart, Chantenay and Danvers. There was nothing to choose between any of the four varieties both as regards yield and quality.

53. (e) *Cabbage.* Two importations, Goldenacre and Chihili (Chinese Cabbage) were tested against Sutton's Pride of India and Peter Henderson's

Late Flat Dutch and Danish Ball Head. In yield, Chihili was superior to any other variety but it is unlikely that this type of cabbage would become popular locally and it was discarded. Goldenacre gave an inferior yield and has also been discarded.

54. (f) *Lettuce.* The importation Imperial 847 did not compare favourably with the standard variety Mignonette and it was discarded.

55. (g) *Garden Peas.* All attempts at testing the five imported varieties were rendered useless by the depredations of bats.

56. (h) *Cantaloupe.* The importation Powdery Mildew Resistant No. 60 did not compare favourably with the standard P.M.R. No. 45.

57. In addition to these vegetable trials, 10 varieties of Soya Bean, 2 varieties of Haricot Bean, 3 varieties of Cowpea, 2 varieties of Pigeon Pea, 1 variety of Mauritius Pea and 1 variety of Cluster Bean were obtained from Amani but unfortunately none of this seed germinated.

58. *Grasses.* Out of eight different types of *Cenchrus sp.* four were selected for further multiplication and trial against Sour Grass.

2. CHEMICAL SECTION.

(*a*) *Analytical Work.*

59. *Food and Drugs.* The total number of samples examined during the year for the various Government Departments and for private individuals was 1,116.

60. *Police Department.* The various samples received from the Police during 1940 are as follows:—

Viscera and examinations for poisons	36
Coins and counterfeiting exhibits	10
Butters and margarines	66
Milks	93
Tea, coffee, cocoa, tapioca, flour, etc.	87
Rum	39
Miscellaneous	13
	344

Poisons detected in exhibits were Nicotine, Mercurous and Mercuric Chloride, Carbolic acid and Nitrobenzene. All coins submitted were counterfeit.

The percentage adulteration in milk samples was 12.

61. *Customs Department.* The following samples were received:—

Petroleum	30
Condensed milk	5
Butter and margarine	20
Miscellaneous	21
	76

Petroleum, butter and condensed milk samples were all up to standard. Miscellaneous samples were submitted for classification.

62. *Water Works Department.* ....

Water	64
Fuel Oil	3
	67

Monthly analyses were carried out on samples of water as supplied to the public as well as on samples drawn from their sources. A general high standard of purity was maintained.

63. *Department of Agriculture and Government Laboratory.*

Sands	15

Analyses were made on a number of samples of Siliceous sand drawn chiefly from the Chalky Mount Area, with a view of ascertaining their suitability for Cement testing.

64. *Sanitary and Parochial Departments.*

Water	9
Milk	128
Miscellaneous	11
	148

Samples of water taken from relatively shallow wells were submitted. In the majority of cases the water was found fit for drinking and domestic purposes.

The percentage adulteration of samples of milk submitted by the Commissioners of Health for St. Michael was 13%. Miscellaneous samples consisted chiefly of E.C. Disinfectants whose Chlorine content is systematically checked.

65. *Agricultural Society.*

Fertilizers	23
Feeding-stuffs	73
Sugars and molasses	99
	195

Fertilizers and Feeding stuffs were submitted by the Analytical Committee under the Fertilizers and Feeding Stuffs Act. All samples conformed to their guaranteed analyses.

Sugars and molasses were examined in connection with the prize awards of the Annual Industrial Exhibition.

66. *Other Government Departments.*

Disinfectants	30
Miscellaneous	2
	32

Disinfectants were examined for the Hospital authorities in conneciton with the proper functioning of their plant.

A sample of milk as supplied to the Leper Hospital was examined.

A sample of sugar was examined for Arsenic.

67. *Private Individuals.* The samples examined under this head were:—

Sugars and molasses	71
Cane juices	27
Fertilizers	11
Miscellaneous	80
	189

The fees receivable by the Government for these analyses amounted to £127. 9. 0.

68. *Commercial Analysis of Sugars and Molasses.* The number of samples of Sugars and Molasses examined during the crop of 1940-41 was 33,866. The

revenue receivable by the Government for these analyses amounted to £1,693. 6. 0. These figures are considerably lower than last year's record of 57,103 samples and reflect a crop season reduced by the year's drought.

69. *Analysis of Seedling Canes.* A total of 523 bundles were crushed and samples analysed. Of these 138 were examined in connection with manurial trials and 385 in connection with seedling and variety trials.

(*b*) *Advisory and Investigational Work.*

70. *Sugar Technology.* Due to the absence of the Chemist on active service, it was not possible to undertake any investigations in sugar technology during the crop under review.

71. *Manurial Trials.* Two manurial trials on sugar cane were reaped at Joes River and Frizers whilst a third trial at Alleynedale had to be abandoned since the canes were cut by the plantation by mistake. The results of these trials were recorded for statistical examination. Analytical determinations were continued on samples of sour grass taken from the manurial trial plots at Todds and Graeme Hall plantations. In addition two more plots were laid down at Pool and Ridge and further samples analysed from these centres.

72. *Soils.* Two samples each from Hothersal and Bath were examined for possible manurial deficiencies. A sample of soil taken from swampy area at Vieux Fort, St. Lucia was mechanically examined and reported on.

73. *Arrowroot Manufacture.* The Arrowroot Factory at Chalky Mount started operations on January 21st and finished on April 25th. A total of 121,657 lb. of roots was crushed and 23,094 lb. of starch manufactured. This represents a yield of 19 lb. of starch per 100 lb. roots and is a great improvement on last year's operations when only 17 lb. of starch per 100 lb. of roots were obtained. The quantity of starch manufactured this crop is three times the quantity obtained last year and constitutes a record for the Factory. This result has been largely due to the greater measure of assistance and control which the Department has exercised in the affairs of the association, both in the field and factory.

74. *Cassava starch and meal.* Experiments were conducted on the crushing, drying and grinding of cassava roots with a view of their possible use or substitution wholly or partially for wheat flour. The economic production of a cassava crop was also studied in relation to the manufacture of starch, using the equipment available at the Arrowroot Factory.

75. *Condensed and Sweetened Milks.* An investigation was carried out on the use of locally made sugar in making a sweetened condensed milk from commercial Evaporated Milk. It was found necessary to sterilize the resulting product to provide adequate preservation. A number of experiments was also made on milk which had been boiled and sweetened so that standards may be ascertained by which adulteration can be determined on these milks supplied to schools.

3. ENTOMOLOGICAL SECTION.

76. Work has continued on the major pests of sugar cane, namely moth borer *Diatraea saccharalis,* root borer *Diaprepes abbreviatus* and the brown hard back *Lachnosterna smithi,* but greater prominence has been given to the relationship between *D. Saccharalis* and new cane varieties to determine whether any particular breeding lines yield canes more resistant to moth borer attack.

77. Much work has been carried out during the year on the insect pests of food crops such as sweet potato, corn and cassava.

78. Cotton pest control has proceeded satisfactorily and no pink boll worm was recorded for the season. Where defoliators were kept in check by adequate spraying, it has been shown that yields of over 1,100 lb. of seed cotton per acre are possible in estate fields as well as in Departmental plots. Late planting, poor soil, lack of attention etc. can however reduce plantation yields to 300 lb. of seed cotton per acre or less.

79. *Small moth borer of sugar cane.* The larval parasite *Metagonystylum minense* which was introduced into Barbados in 1939 from Brazil, St. Lucia and Puerto Rico, was bred throughout 1940 and part of 1941, and a total of over 16,000 mated females was liberated in the canefields of Barbados. A few field recoveries were made from time to time but the numbers recovered were quite unsatisfactory. An island wide survey which was commenced after reaping the 1941 crop has so far produced negative results. This survey will also demonstrate the presence, if any, of other introduced parasites of the larval stages of *D. saccharalis.*

80. The breeding and liberation of the egg parasite *Trichogramma minutum* continues on a satisfactory basis and control over *D. saccharalis* is maintained around the level recorded in the last few years.

81. Work on cane varieties in relation to moth borer has been carried out in co-operation with the reaping of Departmental cane variety plots: records have also been made of rind hardness by means of an experimental machine for testing cane rind hardness. Plots have also been established at Codrington Experimental Station for obtaining continuous records on varieties known to be susceptible to moth borer, varieties known to be comparatively immune, and a full range of standard varieties.

82. At present it would appear that the most outstanding variety as regards tonnage and yield of sugar per acre is also the variety most severely attacked by moth borer, from the egg laying and dead heart stage to the time of reaping. This variety, B.37161, is a hard rind variety of vigorous growth.

83. *Sugar cane root pests.* No effective parasite is yet known which can control root borer, and the native parasite of the brown hard back, namely *Tiphia parallela* is only partial and spasmodic in its effect. The introduced predator *Pyrophorus luminosus,* though still present eight years after its introduction, also appears to be local and limited in its effect. There can be no deviation therefore from the practices recommended by the Entomologist of (i) destroying the grubs in the soil by deep forking cane holes, splitting stumps and ploughing (ii) hand collecting beeties.

84. To facilitate hand collecting of beetles, repeated efforts have been made to organise the planters into groups for collecting beetles and by the provision of a Government subsidy to assist the planter to pay for beetles certified as collected and destroyed.

85. The Entomologist reports that both pests, particularly root borer, have been reduced by past work on these lines to a comparatively low level except that occasionally restricted areas may show a sudden outbreak of beetles. It is feared that a combination of economic and labour difficulties, coupled with an apparent difficulty in finding large numbers of the beetles except in certain areas, may result in a slackening of both methods of control.

86. *Other Cane Pests.* There are principally wood ants *Eutermes* (*nasutitermes*) *costalis* and the cane grub *Metamasius sericeus.* More active and concerted measures have been taken in recent years by planters against wood ants in cane fields, but both pests are encouraged when cane stumps and pieces of dead cane are left in the cane fields.

87. *Cotton.* The year under review has shown that when properly grown and kept free from defoliators, when pink boll worm is absent as it has been now for two years in succession in Barbados, definitely payable yields can be obtained despite unusually low rainfall.

88. *Food Crops.* Past reports of the Entomologist stress the fact that the growing of sweet potatoes will become increasingly difficult owing to infestation of vines by thrips, leaf hopper, scarabee, red spider and to the infestation of the soil by scarabee unless adequate spraying operations are undertaken.

89. The effectiveness of three routine sprayings with lead arsenate as a control over scarabee and thrips was shown conclusively in 1940-41 in plot experiments each of an acre in extent, carried out in potato fields in five different estates. Reduction in yields far below that which could be attributed to shortage in rainfall, have been proved in 1940-41 to be due to insect attack.

90. Preliminary field experiments have also shown that yields of corn can be increased by the use of control measures against *Laphygma frugiperda* and *Heliothis* (*obsoleta*) *armigera*.

91. *Termites.* Further work has been carried out on the distribution of termite species in Barbados and many more requests have been received for the inspection of private buildings infested with wood ants. The introduced species *Coptotermes havilandi* appears to be the most prevalent and damaging species now present in Bridgetown.

92. *Introduced Pests.* Two species of wood boring beetles not hitherto recorded from Barbados have appeared in numbers in wooden packing cases containing goods sent from India. Measures were taken to prevent this introduction, but difficulties arose owing to cases which showed no signs of infestation on arrival, subsequently showing infestation and producing living beetles when left for considerable periods in bond.

4. PLANT DISEASE INSPECTION.

93. *Mosaic Disease of Sugar Cane.* The inspection of the cane crop for the presence of the mosaic disease of sugar cane was carried out until the growth of the cane made inspections impossible. As a result of these inspections the areas of Venture Tenantry, Hothersal Tenantry, St. John; Jacksons Tenantry, St. Michael; Welchman Hall, Lion Castle and Highland Tenantries, St. Thomas; were added to the list of Proclaimed Infected Areas.

94. The Corn Close Season was again proclaimed to cover the period from 16th December, 1940 to 31st March, 1941.

95. The mosaic disease resistant variety, B.35187, was distributed to suitable areas on a much wider scale than in the previous year. Owing to the drought which followed the planting season, the majority of the plants of this variety died and heavy supplying with other varieties had to be carried out. Plants of the resistant variety, B.3439, were also distributed to the lower rainfall areas.

96. The infection in the tenantries of St. Michael, St. Peter, St. James and St. John is still high and a heavy infection was found in Welchman Hall, Lion Castle and Highland Tenantries which caused these areas to be added to the list of Proclaimed Infected Areas. It is pleasing to record that the great majority of plantations are fairly free from mosaic disease, due no doubt, to constant inspection and rogueing of infected stools.

97. The acreage inspected and the number of Infected Holes found during 1940 were as follows:—

	PARISHES.								
	St. Michael	Christ Church	St. Peter	St. James	St. Thomas	St. Joseph	St. George	St. John	St. Andrew
Acreage inspected	2,734¾	3,608¼	1,898¼	807½	1,145¾	204½	1,850	1,383	1,137¾
Number of infected holes	2,486	91	1,621	6,255	3,386	273	565	3,191	569

98. *Cotton Inspections.* No pink bollworm was found either in the field or at the ginnery during the period under review. The cotton leaf worm, *Aletia argillaceae,* made its appearance in December, 1940 and was kept in check by dusting and spraying as was demonstrated by excellent yields being obtained where these operations were carried out in an efficient manner.

99. The holds of seventeen ships were fumigated with "Zyklon B" and 12,520 bags of imported cotton seed were disinfected by means of the Simon's Heater during the year.

100. In accordance with the provisions of the Cotton Diseases Prevention (Amendment) Act, 1937-24, inspection of articles suspected to contain cotton was carried out.

101. The Okra Control Season was again proclaimed to extend from 1st July to the 31st October, 1940 and permits were issued in the usual manner.

102. The following imported planting material was inspected during the year:—

190	Pkgs. Bulbs, Rose Trees, Orchids, Vegetable and Flower Garden seeds	Examined & Passed
14	Coconut Plants	,, ,, ,,
4	Bags Seed Coconuts	,, ,, ,,
10	Pkgs. Bulbs	,, ,, ,,
24	Pkgs. Orchids	,, ,, ,,
11	Orchid Plants	,, ,, ,,
1	Pkge. Ferns	,, ,, ,,
1	Fern	,, ,, ,,
1	Begonia	,, ,, ,,
1	Bag Pineapple Suckers	,, ,, ,,
2	Pkgs. Queen of Flower cuttings	,, ,, ,,
2	Pkgs. Hibiscus cuttings	,, ,, ,,
2	Palms	,, ,, ,,
2	Pkgs. Citrus Plants	,, ,, ,,

6 Citrus plants	....	....	....	Examined & Passed		
16 Pkgs. Miscellaneous Plants		....	....	„	„	„
2 Pkgs. Miscellaneous Plants		....	....	„	„	„
2 Pkgs. Plants	....	....	....	Roots washed		
19 Plants	....	....	....	„	„	
2 Lily Plants	....	....	....	„	„	
1 Mango plant	....	....	....	„	„	
1 Fern	....	....	....	„	„	

103. In accordance with regulations made in Trinidad (Trinidad & Tobago No. 13 of 1938), 70 certificates were issued during the period 1st April, 1940 to 31st October, 1940; this entailed the inspection of 429 packages of vegetables.

5. PEASANT AGRICULTURE.

104. The Staff of Peasants' Agricultural Instructors now consists of three instructors. The Senior Instructor resides in the parish of St. Joseph and visits smallholders in the parishes of St. John, St. Joseph, St. Thomas, St. Andrew, St. George and St. Michael. One Junior Instructor resides in the parish of St. Philip and is responsible for the parishes of St. Philip and Christ Church whilst the other instructor resides in the parish of St. James and is responsible for peasant instruction in the parishes of St. James, St. Peter and St. Lucy.

105. *Lectures.* Eight lectures were given to peasants and twenty-eight to pupils of elementary schools on agricultural and horticultural problems during the year.

106. *School Gardens.* Seven new school vegetable gardens were started this year, making a total of fifty-seven. All of these were inspected and points were awarded according to the degree of efficiency. Previously only flowers were grown in most of the new gardens but, owing to the war and the grow-more-food compaign, these plots have been planted in vegetables. Interest continues to be displayed by many of the teachers but some of the gardens are not as well run as they should be. It is considered that dry farming and proper rotations should be given greater attention. The four best kept gardens throughout the year were, in order of merit:—(a) St. Augustine Boys' (b) St. John Baptist Boys' (c) Mt. Tabor Boys' (d) St. Jude's Boys'.

107. *Number of Districts Visited etc.* Three hundred and eighty four districts were visited during the year and advice was given on agricultural and horticultural subjects.

108. *Demonstrations:—Top Working Mango trees etc.* One hundred and eighty-four mango trees were top worked during the year. Citrus trees were budded, pruned and sprayed. Other fruit bearing trees also received attention.

109. *Distribution of Planting Material.* Distribution was made to peasants and schools of the following planting material:—Vegetable seeds, mosaic disease resistant and other new varieties of sugar cane, sweet potatoes, cassava, fruit trees, seed coconuts of the dwarf variety, fodder crops and ground provisions.

110. *Goats.* Two purebred British Alpine bucks were stationed this year at:—(a) Wason's House, St. Philip and (b) Holetown, St. James. Two hundred and twenty-six does were served by these bucks free of charge. This service is gradually being extended but demands are still too numerous to be filled and more bucks are greatly needed.

111. *Poultry.* In pursuance of the objects mentioned in paragraph 95 of the 1940 report, six hundred and five eggs were distributed to peasants. Unfortunately this scheme had to be temporarily abandoned as chickens which were not very healthy were returnd by peasants with the result that some fatal fowl diseases were brought into the brood. The cockerels which were distributed during 1940 are serving a very useful purpose.

112. *Surveys.* The survey of peasant agriculture is being continued. An effort was made during the year to ascertain the number of districts in which irrigation schemes could be instituted in the event of financial assistance being taken. Opportunity is being taken while making these surveys to impress on peasants the value of the Peasants' Loan Bank.

113. *Peasants' Exhibition.* There were 670 exhibits of vegetables, fruit, ground provisions and sugar canes sent in to the exhibition. All the classes included exhibits of excellent quality and the competition on the whole was very keen. His Excellency the Governor again awarded a special prize.

6. THE PEASANTS' LOAN BANK.

114. The Bank showed an increase of business during the year under review.

115. A total amount of £1680. 4. 2. was advanced to 334 persons owning 512 acres of arable land of which 307 acres were growing canes and 205 acres under preparation. During the previous year £1,305. 4. 2. was loaned to 263 persons.

116. The overhead costs of running the Bank amounted to £496. 1. 9½.

117. Under the present Act, loans may only be made to peasants who own their land for the payment of taxes labour and purchase of artificial manures. It is hoped that the Act may be extended to permit loans to be made to provide for irrigation, purchase of live stock and to enable the peasant to pay the balance of any purchase money owing in respect of his holding provided that such amount does not exceed forty per cent. of the fair market value of the holding.

SECTION III.

AGRICULTURAL LEGISLATION.

This section includes only the more important legislation.

1. 1940-22. 29th June, 1940. The Exportation of Fruit Act.
   This Act makes provision for the examination of fruit intended for export, the term fruit meaning any fresh fruit, nut or vegetable to which the Act shall be made to apply by Regulations.
   By Regulations made on 9th October, 1940 the provisions of the Act were applied to sweet potatoes, yams, cassava, eddoes and tannias.

2. 1940-28. 24th August, 1940. An Act to amend the Department of Science & Agriculture Act, 1925 (1925-32) as amended by the Department of Science & Agriculture (Amendment) Act 1935 (1935-68) and by the Department of Science and Agriculture (Amendment) Act, 1938 (1938-24). By this Amendment Act the post of Assistant Director of Agriculture and Botanist was abolished and the post of Botanist restored. A new post of Assistant Botanist was created. Further it empowers the Government from time to time to appoint such one of the officers of the Department as he shall think fit to be Deputy Director of Agriculture: the officer so appointed to receive a further salary at the rate of not exceeding two hundred pounds per annum.

3. 1940-62. 30th December, 1940. An Act to amend the Plant Pest and Disease (Importation) Act, 1932 (1932—32).
This amendment of the Principal Act classifies planting material under three classes and articles may be assigned to such class as may be prescribed from time to time by the Governor-in-Executive Committee by means of Orders published in the Official Gazette. A classification of planting material for the purposes of the Principal Act and this Amendment Act was made by an Order issued on 4th March, 1941.

4. 1941—21. 31st March, 1941. An Act to make temporary provision in respect of Fancy Molasses, entitled The Fancy Molasses (Enabling) Act, 1941.
For a period of one year ending 31st August, 1941 cane juice evaporated to the consistency of syrup by any process other than a process by which its final evaporation is effected by boiling in an open vessel at atmospheric pressure, may, if in the opinion of the Fancy Molasses Control and Marketing Board it is expedient so to do, be deemed to be Fancy Molasses for the purpose of any Act relating to same.